

## CLAIM AMENDMENTS

1           1. (Currently amended) A ~~substantially two-phase~~ hard  
2 metal substrate body consisting ~~essentially~~ of a WC hard material  
3 phase consisting of WC and a binder phase of 3 to 25 mass % which  
4 apart from at least one of the binder metals Fe, Co and/or Ni  
5 contains up to 15 mass % of a dissolved dopant selected from the  
6 group consisting of Al, Cr, V, Nb, Ta, Ti, Zr, and Hf, wherein the  
7 percentage proportion of all dopants as a whole in the ~~two-phase~~  
8 hard metal substrate body is limited to a maximum of 4 mass %;  
9 wherein the proportion of a cubic phase consisting of said dopant  
10 in undissolved form in the ~~two-phase~~ hard metal substrate is less  
11 than 4 volume % and; wherein the binder metal content in an edge  
12 zone of the ~~two-phase~~ hard metal substrate drops to less than half  
13 the binder metal content in the substrate body interior.

1           2. (Currently amended) The ~~substantially two-phase~~ hard  
2 metal substrate body according to claim 1 wherein the concentration  
3 of the binder metal in the binder phase falls gradually toward the  
4 substrate body surface and the concentration of the dopant in the  
5 binder phase gradually increases in a corresponding manner.

1           3. (currently amended) The ~~substantially two-phase~~ hard  
2 metal substrate body according to claim 1 wherein the grain size of  
3 the WC is  $\leq 1.5 \mu\text{m}$  whereby the WC fine hard material phase (grain

size  $\leq 0.8 \mu\text{m}$ ) and/or with WC ultrafine grain hard material phase (grain size  $\leq 0.5 \mu\text{m}$ ), preferably contain Cr, V and/or Ta as dopant.

4. (Currently amended) The ~~substantially two-phase~~ hard metal substrate body according to claim 1 wherein at least one layer is applied to the substrate body surface, the layer being comprised of a carbide, nitride and/or carbonitride of Ti, Zr and/or Hf and/or of  $\text{Al}_2\text{O}_3$ ,  $\text{HfO}_2$ ,  $\text{ZrO}_2$ , oxides, amorphous carbon, diamond, cubic boron nitride, carbon nitride ( $\text{CN}_x$ ) or another compound of at least one of the elements B, C, N and/or O.

5. (currently amended) The ~~substantially two-phase~~ hard metal substrate body according to claim 1 wherein in the boundary zone close to the surface there is an enrichment with nitride or carbonitride of the metal dopant.

6. (Currently amended) A method of producing a ~~two-phase~~ hard metal substrate body according to claim 1 in which [[the]] a starting mixture consisting of WC, a binder metal, and a dopant is preheated powder metallurgically and is prepressed to a green body and then in an atmosphere of a furnace is heated and sintered, characterized in that wherein in the heating phase, after reaching the eutectic, but no later than reaching the sintering temperature the vacuum or inert gas atmosphere is replaced with a  $\text{N}_2$  atmosphere

9 with a N<sub>2</sub> pressure of  $\leq 10^5$  Pa and is maintained at least until the  
10 sintering temperature is reached.

1 7. (Currently amended) The method of making a ~~two-phase~~  
2 hard metal substrate body according to claim 1 in which the  
3 starting mixture is powder metallurgically treated and is pressed  
4 to a green body and finally heated in an atmosphere of a furnace  
5 and sintered, ~~characterized in that~~ wherein after finish sintering  
6 or optionally in a final treatment above the eutectic temperature,  
7 the sintered body is maintained in a N<sub>2</sub> atmosphere under a pressure  
8 (p) of  $10^5$  Pa  $< p < 10^7$  Pa for at least 10 minutes.

1 8. (Currently amended) The method according to claim 6  
2 ~~characterized in that~~ wherein the nitrogen atmosphere is  
3 established by introducing precursors that is N-containing gases  
4 whereby the nitrogen is formed *in situ* in the gas atmosphere.

1 9. (Currently amended) The method according to claim 6  
2 ~~characterized in that~~ wherein the ~~two-phase~~ hard metal substrate  
3 body is heated up to 1250°C during the heating phase and this  
4 temperature is held for at least 20 minutes ~~, preferably more than~~  
5 ~~1 hour~~, before the heating up is continued to the sintering  
6 temperature.

1           10. (Currently amended) The method according to claim 6  
2 ~~characterized in that~~ wherein initially in the heating up phase at  
3 about 1200°C the previously existing vacuum is replaced by an inert  
4 gas atmosphere, ~~preferably with a pressure of 10<sup>3</sup> Pa to 10<sup>4</sup> Pa and~~  
5 only upon reaching the sintering temperature is a nitrogen  
6 containing atmosphere established with a higher pressure ~~7~~  
7 ~~preferably > 10<sup>4</sup> Pa.~~

1           11. (Currently amended) The method according to claim 6  
2 ~~characterized in that~~ wherein the heating up rate and the cooling  
3 down rate amounts to up to 10°C/min ~~7, preferably between 2°C/min~~  
4 ~~and 5°C/min.~~

1           12. (Currently amended) The method according to claim 6  
2 ~~characterized in that~~ wherein the starting mixture contains in an  
3 amount of up to 15 mass % of the binder phase additional carbides,  
4 nitrides, carbonitrides of the elements of Group IVa or VIa of the  
5 periodic system or Al or complex carbides, complex nitrides and/or  
6 complex carbonitrides of the form  $Ti_2AlC$ ,  $Ti_2AlN$ ,  $Cr_2AlN$ ,  $Cr_2AlC$ .